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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/574,493

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Tetsuichi Motegi

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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

KERNS, KEVIN P

ART UNIT

PAPER NUMBER

1793

NOTIFICATION DATE

DELIVERY MODE

04/01/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No. 10/574,493	Applicant(s) MOTEGI ET AL.	
	Examiner Kevin P. Kerns	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2008 and 17 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 24-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 24-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 April 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicants' election with traverse of Group Ia (claim 24) in the reply filed on February 17, 2009 is acknowledged. The traversal is on the ground(s) that a lack of unity of invention has not been properly established, and examination of all claims would not create a significant additional burden on the examiner. Upon further review of these groups of claims, these arguments are found to be persuasive, and both Groups I and II (all of claims 24-34) are examined in the sections that follow.

Drawings

2. Figures 2 and 6 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "(73)" (see page 8, line 20); "(84)" (see page 8, line 25); "(146)" (see page

Art Unit: 1793

12, line 24); “(174)” (see page 13, line 29; page 14, line 16; and page 15, line 11); and “(224)” (see page 17, lines 10 and 27; and page 18, line 19). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The disclosure is objected to because of the following informalities: on page 7, last line, replace “3” with “31” after “body”. On page 14, line 26, it is unclear what is meant by “magnesium alloy clean...”, and it is believed that the term “is” should be added between “alloy” and “clean”. On page 15, line 28, replace “devoice” with “devoid”. On page 17, line 12, replace “123” with “131” after “mold”. On page 19, last line, replace “11,11” with “11,111”. On page 20, line 7, replace “body7” with “body”. Appropriate correction is required.

Claim Rejections - 35 USC § 102/103

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 30-34 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Adachi et al. (US 6,769,473).

Art Unit: 1793

Regarding claims 30-34, Adachi et al. disclose a system (apparatus) and method for manufacturing and shaping semisolid and molten metals of a partly molten (semisolid) or molten metal slurry, respectively, of magnesium alloy by cooling the alloy and subsequently producing a magnesium alloy ingot (abstract; column 5, lines 3-5; column 20, lines 29-56; column 26, lines 38-54; column 28, lines 13-23; column 29, lines 44-52; Examples 10-13; and Figures 21, 25, 29, 32, 37, and 71), in which the system and method includes at least the following features/steps:

providing a melting furnace (ladle 10 of Figures 29 and 32) that melts metal, including magnesium alloy, for preparation of molten magnesium alloy;

providing a tilted cooling body (jig 1,20 of Figures 21 and 32) having a tilted surface that defines a passage/path to allow molten or semisolid magnesium alloy supplied from the melting furnace to flow, such that the tilted cooling body (jig 1,20) further comprises a cooling mechanism (cooling pipes 4,4a,4b) to forcibly cool the surface of the tilted cooling body (1,20);

providing/allowing the molten magnesium alloy (melt M) to flow down along the upper tilted surface of the tilted cooling body (jig 1,20 of Figures 21 and 32) that is forcibly cooled by a cooling mechanism (cooling pipes 4,4a,4b), such that the molten magnesium alloy generates and spheroidizes primary crystals on the tilted cooling body (1,20);

applying vibrations to the molten metal in contact with the tilted cooling jig (arranged at an angle between 20 to 80 degrees -- see Figures 21 and 32) onto which the molten magnesium alloy is flowing, such that the jig is vibrated (column 5, lines 3-5)

Art Unit: 1793

and is maintained in a semi-solid state, such that the device or cooling body is capable of producing a magnesium alloy at temperatures lower than a liquidus state and higher than a solidus state (defining a semi-solid state), resulting in crystallizing of the alloy to form spherical primary crystals (column 29, lines 44-45; and Figures 29 and 32);

providing a mold that receives the magnesium alloy metal slurry flowing down in a partly molten (semisolid) state from the surface of the tilted cooling body (1,20) to form an ingot in the mold; and

providing a mold cooling and vibrating/rotating mechanism (Figure 27) to result in forcibly cooling and vibrating of the semisolid slurry in the mold to form the ingot, and a conveying/driving mechanism (Figures 25 and 37) to move the cooling body to withdraw it from the inlet of the mold.

Although not specifically shown (as a structural element) by Adachi et al., the teachings of Adachi et al. include that the crystal nuclei *"are generated by applying vibrations to the molten metal in contact with either the jig or the insulated vessel or both"* (column 5, lines 3-5). As a result, it would be inherent and/or obvious that application of vibrations would be generated by a "vibrating mechanism" that is not distinctly shown (in structural form) by Adachi et al. In addition, not only do Adachi et al. disclose "crystal nuclei" to initiate production of crystals, but they also disclose the *"generation of spherical primary crystals and ending with the molding step"* (column 29, lines 44-45), and is further disclosed in Examples 10-13.

Claim Rejections - 35 USC § 103

9. Claims 24-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adachi et al. (US 6,769,473).

Regarding claims 24-29, Adachi et al. disclose and/or suggest the features of system (apparatus) claims 30-34. Adachi et al. do not specifically disclose the step of forcibly liberating the crystals from the surface of the (tilted) cooling body or on the inner surface of the mold in an initial stage of crystallization and positioning the cooling body into the mold before the steps of crystal generating and liberating.

However, as set forth in the above 35 USC 102/103 rejections, Adachi et al. disclose the production of not only “crystal nuclei” (which would be considered by one of ordinary skill in the art as an “initial” stage of crystallization), but also “spherical primary crystals” generated on the tilted cooling body and on the inner surface of the mold. Although the above “applying vibrations...” and “providing a mold cooling and vibrating/rotating...” steps of the tilted cooling body and/or mold, as disclosed by Adachi et al., do not necessarily result in forcibly liberating the crystals from surfaces (as a portion of crystals would solidify on the surfaces of the cooling body or mold prior to forcibly liberating), one of ordinary skill in the art would have recognized that the temperatures of the cooling body and mold would be readily adjusted to be a few degrees higher or lower while still being in the semisolid (partly molten) state via routine experimentation, thus resulting in the vibrations to enhance forcibly liberating the crystals from the surfaces. In addition, the temperature control would also affect the state of the molten magnesium alloy with regard to its “initial” stage of crystallization, to

Art Unit: 1793

be selectively crystallizing on the surface of the cooling body or on the inner surface of the mold, thus resulting in a desired degree of fine-grained, spherical crystallization of the magnesium alloy material to form an ingot in a convenient and inexpensive manner, without relying upon mechanical or electromagnetic agitation (Adachi et al.; abstract).

Response to Arguments

10. The examiner acknowledges the applicants' amendment provided with the request for continued examination received by the USPTO on November 10, 2008. After mailing of a restriction requirement on January 14, 2009, the applicants' traversal in their restriction response dated February 17, 2009 was deemed persuasive (see above section 1). New objections to the drawings and specification are raised in above sections 2-4. The applicants have cancelled claims 13-23, and have added new claims 24-34. Claims 24-34 are currently under consideration in the application.

11. Applicants' arguments with respect to claims 13-23 (which were cancelled and replaced in favor of new claims 24-34) have been considered but are moot in view of the new ground(s) of rejection.

With regard to the applicants' remarks/arguments on pages 6-8 of the amendment dated November 10, 2008, it is noted that the applicants' major argument is that Adachi et al. (US 6,769,473) teaches that the cooling body is cooled to "*generate crystal nuclei instead of crystals*". The examiner respectfully disagrees, as Adachi et al. disclose and/or suggest that fine-grained, spherical crystallization of magnesium alloy

Art Unit: 1793

materials is effected by the cooling body in the "initial" crystallization stage via formation of crystal nuclei (abstract; column 29, lines 44-45; and Examples 10-13). Contrary to the applicants' statement (in the 2nd paragraph on page 7 of the remarks/arguments section), the process of feeding the "semisolid alloy" containing a large number of crystal nuclei into an insulated vessel also would include a portion of spherical crystals initiated by such crystal nuclei, as would be inherent and/or obvious in view of the crystal formation being dependent on the temperature of the alloy. Moreover, such "crystal nuclei" are not precluded from being "crystals" themselves in the "initial" crystal growth stage. Overall, the system/apparatus claims 30-34 are rejected under 35 USC 102/103, due in part because the "crystals" (product) do not impart any additional structural features to the system/apparatus, as well as these claims including several "intended use" limitations, such as "for forcibly cooling..." and "for vibrating the tilted cooling body to liberate the crystals...". See MPEP 2114 and 2115. Since previously examined claims 13-23 were cancelled and replaced with new claims 24-34, the (new) 35 USC 102/103 and 35 USC 103(a) rejections above are in a revised format and address practically all of the applicants' remarks/arguments set forth in the November 10, 2008 amendment (as contrasted with the prior 35 USC 102(e) and 35 USC 103(a) rejections of the final rejection, including combination with US 6,165,411, which is no longer applied in the 35 USC 103(a) rejections). In view of the above reasons, claims 24-34 are rejected.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin P. Kerns whose telephone number is (571)272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin P. Kerns
Primary Examiner
Art Unit 1793

/Kevin P. Kerns/
Primary Examiner, Art Unit 1793
March 26, 2009